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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,194	04/20/2007	Michael Sudakov	062918	1055

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WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER	
LOGIE, MICHAEL J	

ART UNIT	PAPER NUMBER
2881	

NOTIFICATION DATE	DELIVERY MODE
07/13/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

Office Action Summary	Application No.	Applicant(s)	
	10/598,194	SUDAKOV ET AL.	
	Examiner	Art Unit	
	MICHAEL J. LOGIE	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-18,21 and 22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-18, 21 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/08/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

An "Amendment" was received on 29 June 2010, in response to Office Action of 30 March 2010. Claims 1-6, 10-13 and 19-20 have been cancelled. Claim 14 has been amended. Claims 21 and 22 have been newly added. Claims 14-18 and 21-22 are now pending.

Response to Arguments

Applicant's arguments with respect to claims 14-22 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

Claim 15 recites the limitation "said set of trapping states" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Line 11 of claim 14 recites the limitation "DC levels applied on the electrode" is vague and indefinite. Is this one of the electrodes from line 6 or should this be

"electrodes" as in line 6? It will be assumed that this was meant to be “electrodes" as in line 6.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frazen (USPN 5,763,878) and further in view of Ding (USPN 6,900,433).

In regards to claim 14, Frazen teaches a method of extracting ions from a linear ion trap to time-of-flight mass spectrometer (inherent in the apparatus of figure 1), said ion trap being driven by a set of switches (col. 8, lines 10-30 teach an RF voltage is stopped (i.e. switched) in the zero sweep to outpulse ions and switching the ion trap back to filling), said method comprising the following steps:

cooling said trapped ions by collisions with a buffer gas down to equilibrium (col. 2, lines 51-61 and col. 3, lines 53-60 teach collision cooling gas to form a thin thread of ions in an axis thus the ions are at equilibrium because they have an “equal and narrow distribution of energy (col. 2, lines 55-56)); and

extracting the trapped ions in said ion trap to said time-of-flight mass spectrometer by applying extracting levels on the electrodes of said ion trap under conditions, where discrete levels applied on the electrode are kept constant, until all the

trapped ions are extracted (col. 8, lines 10-30 teach stopping the RF voltage applied to the trap for outpulsing ions and switching the ion trap back to filling. Thus the trap is kept at a constant 0 volts (i.e. the RF voltages applied to the electrodes of the trap is stopped thus applying constant discrete levels of 0 volts to each quadrupole rod (i.e. electrode)) until all ions are outpulsed (i.e. extracted). Figure 1 shows the ion trap extracting ions to a TOF-MS).

Frazen differs from the claimed invention by not disclosing digital switches and trapping said ion in said ion trap by applying trapping voltages having waveform created by fast switching of the application on electrodes of said ion trap between discrete DC levels.

However, Ding teaches digital switches (fig. 1, 3) and trapping said ion in said ion trap by applying trapping voltages having waveform created by fast switching of the application on electrodes of said ion trap between discrete DC levels (figures 3 and 4, note: col. 3, lines 1-25).

Ding modifies Frazen by providing digital switches.

Since both Frazen and Ding are directed towards mass spectrometry, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the digital switches of Ding in the method of Frazen because "the timing accuracy of the digital control signal is much better than the period of the clock pulses and so very high frequency resolution of the digital control signal can be achieved" (col. 2, lines 58-62).

In regards to claim 15 Frazen differs from the claimed invention by not disclosing where said set of trapping states consists of two states, each of said states lasts for half of a set period.

Ding teaches where said set of trapping states consists of two states (fig. 3, rectangular wave (b) shows two states high and low), each of said states last for half of a set period (as seen in figure 3).

Ding modifies Frazen by providing fast digital switches.

Since both Frazen and Ding are directed towards mass spectrometry, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the fast digital switches of Ding in the method of Frazen because "the timing accuracy of the digital control signal is much better than the period of the clock pulses and so very high frequency resolution of the digital control signal can be achieved" (col. 2, lines 58-62).

In regards to claim 16 Frazen differs from the claimed invention by not disclosing wherein said buffer gas fills said ion trap at pressures in the range from 0.01mTorr to 1mTorr.

Ding teaches wherein said buffer gas fills said ion trap at pressures in the range from .01 mTorr to 1mTorr (col. 5, lines 15-17).

Ding modifies Frazen by providing fast digital switches.

Since both Frazen and Ding are directed towards mass spectrometry, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the fast digital switches of Ding in the method of Frazen because "the timing accuracy of the

digital control signal is much better than the period of the clock pulses and so very high frequency resolution of the digital control signal can be achieved" (col. 2, lines 58-62).

In regards to claim 17, Frazen differs from the claimed invention by not disclosing wherein said set period is in the range from 0.3 micro seconds to 1.0 micro seconds.

Ding teaches wherein said set period is in the range from .3 micro seconds to 1.0 micro seconds (fig. 4 shows period Td wherein the period can be set to suit the intended purpose).

Ding modifies Frazen by providing fast digital switches.

Since both Frazen and Ding are directed towards mass spectrometry, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the fast digital switches of Ding in the method of Frazen because "the timing accuracy of the digital control signal is much better than the period of the clock pulses and so very high frequency resolution of the digital control signal can be achieved" (col. 2, lines 58-62).

In regards to claim 18, Frazen differs from the claimed invention by not disclosing where the final trapping state prior to said ejection state has a duration of approximately one quarter of said set period.

Ding teaches where the final trapping state prior to said ejection state has a duration of one quarter of said set period (as seen in figure 4).

Ding modifies Frazen by providing fast digital switches.

Since both Frazen and Ding are directed towards mass spectrometry, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the fast digital switches of Ding in the method of Frazen because "the timing accuracy of the

digital control signal is much better than the period of the clock pulses and so very high frequency resolution of the digital control signal can be achieved" (col. 2, lines 58-62).

Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined invention of Frazen (USPN 5,763,878) and Ding (USPN 6,900,433) and further in view of Okumura et al. (US pgPub 2003/0066958).

In regards to claim 21, the combined invention differs from the claimed invention by not disclosing wherein an opposite pair of electrodes (Y pair) of said set of electrodes is connected to a first subset of said digital switches capable of switching at a repetition rate, and at least one of another oppositely positioned pair of electrodes (X pair) of said set of electrodes is connected to a second subset of said number of said digital switches which has a higher voltage rating, said second subset of digital switches connects DC voltage supply to said X electrodes for election of said ions.

Okumura teaches wherein an opposite pair of electrodes (Y pair) of said set of electrodes is connected to a first subset of said number of said fast electronic switches capable of switching at a repetition rate (fig. 3, 21 and 24, which are equivalent to electrode 15 of figure 1 connected to switches 48), and at least one of another oppositely positioned pair of electrodes (X pair) of said set of electrodes is connected to a second subset of said number of said fast electronic switches which has a higher voltage rating (fig. 3, 22 and 23 which are equivalent to electrodes 16 and 17 of figure 1 connected to switches different switches 48, wherein electrodes 21 and 24 conventionally does not require a higher voltage), said second subset of fast electronic

switches connects said DC voltage supply to said X electrodes for ejection of said ions ([0051], note figure 1, switches 48 to DC power supplies 41,43 and 44).

Okumura et al. modifies the combined invention by providing subsets of switches.

Since both the combined invention and Okumura teach mass spectrometry, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the subsets of switches of Okumura et al. in the combined method because it broadens "the mass-to-charge ratio range analyzable by one process of ion accumulation in the ion trap" ([0018] of Okumura).

In regards to claim 22, Frazen differs from the claimed invention by not disclosing wherein said first subset of said number of said digital switches includes 2 serially linked high repetition switches, switching between a positive and negative voltage to provide said Y pair of electrodes of said electrodes with a rectangular waveform.

Ding teaches wherein said first subset of said fast electronic switches includes 2 serially linked high repetition switches, switching between a positive and negative voltage to provide said Y pair of said set of electrodes with a rectangular waveform (abstract).

Ding modifies the combined invention by providing a rectangular wave voltage to the ion trap.

Since both the combined invention and Ding teach linear ion traps, it would be obvious to one of ordinary skill in the art to have the rectangular waveform of Ding in the device of the combined invention at the time the invention was made because it would

provide for a means for varying the duty cycle of every nth wave of the rectangular wave voltage to cause ejection of trapped ions having a predetermined range, thus providing selectivity to the mass scan (col. 3, lines 5-10 of Ding).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL J. LOGIE whose telephone number is (571)270-1616. The examiner can normally be reached on 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. L./
Examiner, Art Unit 2881

/Jack I. Berman/
Primary Examiner, Art Unit 2881